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NETWORK SERVICES

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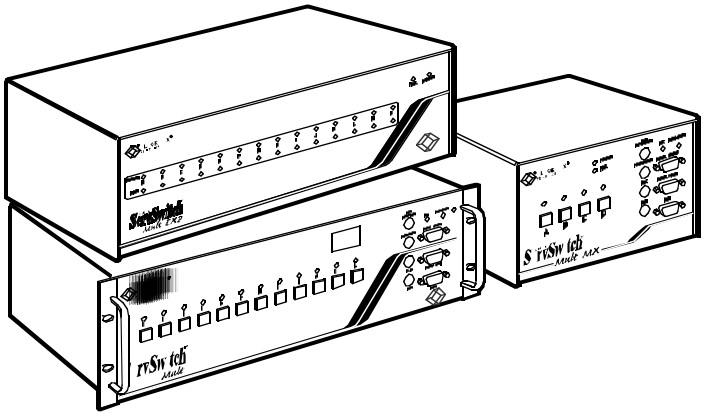
Black Box Corporation.

ServSwitch Multi and ServSwitch Multi MX

Manage hundreds of different CPUs—PC, Mac®, Sun®, RS/6000®, SGI®, or HP®—from one keyboard/monitor/mouse station, or from several stations.



Key Features

- *Access up to 3048 CPUs of different platforms with a single keyboard/monitor/mouse station, or access anywhere from several to several hundred CPUs with multiple stations.*
- *Use any of a variety of keyboard and mouse combinations; use any of a variety of video types at resolutions up to 1600 x 1200. Also switch audio and serial I/O.*
- *Build the switch <u>you</u> need with modular interface cards. They're hot-swappable: You don't have to bring your LAN down to modify your KVM-sharing system.*
- *Select CPUs, scan ports, customize keyboard response, etc., with keyboard commands or—with an optional Display Card—from on-screen menus.*

Managing a room full of servers of different platforms used to be a real challenge. You not only had to figure out where to put them—even a dozen monitors would eat up most of the tabletop space in an average room—but, once you did, you had to resign yourself to maintaining horrible tangles of cabling and to rushing around the room from keyboard to keyboard.

Now the ServSwitch Multi—one of our most sophisticated electronic keyboard/video/mouse switches—makes that problem a thing of the past. You can attach as many as 3048 IBM® PC or RS/6000®, Apple® Macintosh®, Sun Microsystems®, Silicon Graphics®, or HP type CPUs to a set of ServSwitch Multis and use a single shared monitor, keyboard, and mouse to administer them all. Or you can attach a large number of CPUs and administer them from several stations.

The ServSwitch Multi can also switch access to a serial device. And—with the appropriate cables—it can even switch audio I/O.

The key to the ServSwitch Multi's amazing flexibility is its modular design. Want one station to control ten CPUs? Just slide ten CPU Interface Cards into the chassis of the Base Unit—one User-Interface Card is preinstalled—and plug in the associated one-to-many cables. Want to administer seven CPUs with three stations? Insert seven CPU cards and two user cards. Want to manage dozens of CPUs? Call tech support first, then install Expansion Transmit and Receive Cards—either single-cable or CAT5-cable type—in two or more Base Units, special dedicated Expansion Chassis (EXPs), or smaller but still powerful ServSwitch Multi MX units.

You can configure the ServSwitch Multi, scan CPU ports, and perform many other functions by entering simple commands from the shared keyboard(s). If you install the optional User-Interface Card with On-Screen Display, you can do all these things (*plus* naming and administering channels and users) through on-screen menus.

With the optional Management and Serial Control Cards, you can even do terminal-based serial management of routers and other equipment from the user stations.

Typical Application

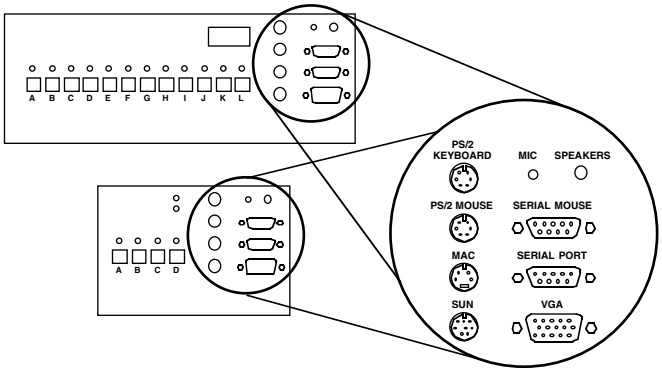
Use a Sun keyboard and mouse and a multisync monitor to manage a rack full of IBM PC servers, a counter full of Mac servers, and a Sun SPARCstation®.

Interconnect ServSwitch Multis to administer all of the CPUs in a data center from several different places.

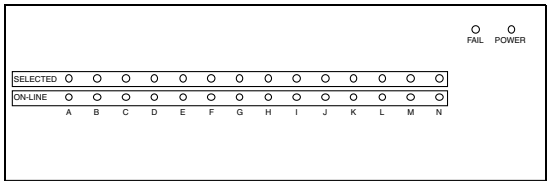
Technically Speaking

- ServSwitch Multis support many **video** standards; set DIP switches on the CPU Interface Cards for your desired video type, as well as for shared-use timeout (see below) and keyboard translation. (Using non-multisync monitors with some platforms will require special video adapters.)
- The units also support many types of **keyboards and mice**, as long as each station's keyboard and mouse are the same type (unless you're using a PC serial mouse, which is supported by all platforms' cabling). See **Specifications** on page 4.
- When **multiple stations** are attached to the ServSwitch Multi, user access to CPUs can either be shared or independent. Stations with shared access can all see and hear the output of a given CPU, but only one of them can input commands and data at any given time. When there is no keyboard or mouse input from the active station for a user-selectable timeout period, another station may become active. Stations with independent access, on the other hand, can input commands and data independently of each other. If each one has access to all CPUs, there can only be four independent stations in the system at the same time on a full-size Switch (only two on an MX).
- ServSwitch Multis can be interconnected, but are not designed to be cascaded with any other Serv type switch.
- The new -R2 versions of the ServSwitch Multi feature several improvements:
  – The power supply delivers more power;
  – It's much easier to insert Cards;
  – New chassis style can be rackmounted just by taking the cover off and attaching a special Rack-mount Kit faceplate (MX can't be rackmounted);
  – You can attach CPUs that output dual video feeds;
  – New commands make it easier for users to work with each other, especially for training purposes.

The front panels of a ServSwitch Multi Base Unit and a ServSwitch Multi MX, with a closeup on their local-console connectors.

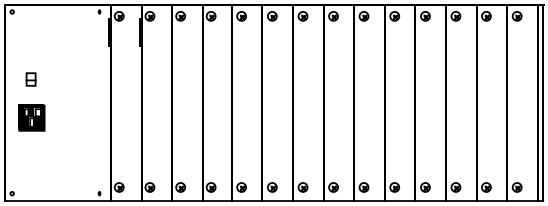


The front panel of a ServSwitch Multi Expansion Chassis (EXP). It has no dedicated local-console connectors, but can hold up to 14 plug-in cards of any available type (see page 3) in any combination.

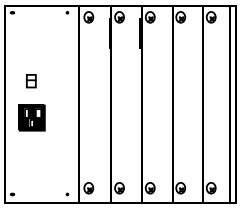


The rear panel of a ServSwitch Multi Base Unit. Except for the leftmost slot (which houses the local-console interface) and the next-to-leftmost (which should not hold a CPU card), the slots can hold up to 13 plug-in cards of any available type (see page 3) in any combination (but refer to the note about multiple stations in ***Technically Speaking*** *above).*

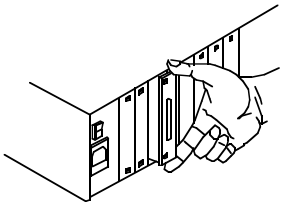
The rear panel of an Expansion Chassis is identical, but all 14 of its slots can hold any available cards.



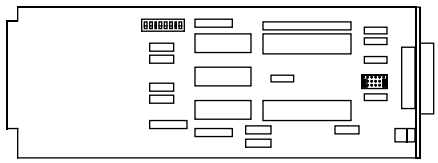
And here's the rear panel of a ServSwitch Multi MX. Except for the leftmost slot (which houses the local-console interface), the slots can hold up to 4 plug-in cards of any available type (see page 3) in any combination (but, again, refer to the note about multiple stations in ***Technically Speaking*** *above).*



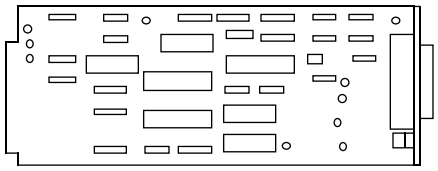
Install any of these interface, expansion, and control cards and cables to put together the type of switching matrix you want.



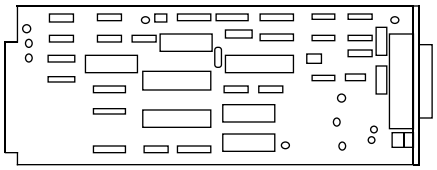
All Cards slide into the enclosure of the Base Unit or Expansion Chassis



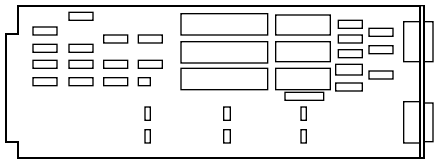
Autosensing Computer-Interface Card (our product code KV2000C)



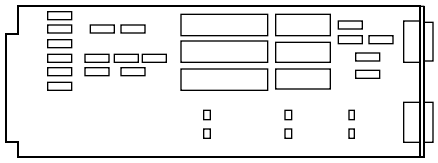
Universal User-Interface Card (our product code KV2500C)



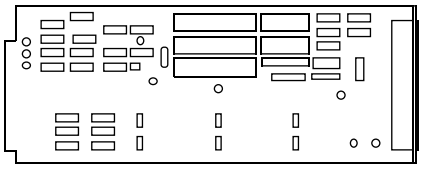
User-Interface Card with On-Screen Display (our product code KV2550C-R2)



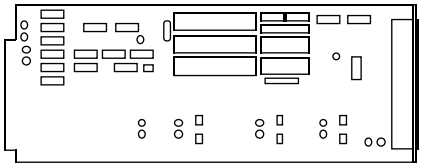
Expansion Transmit Card (our product code KV1601C)



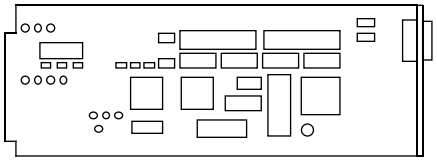
Expansion Receive Card (our product code KV1602C)



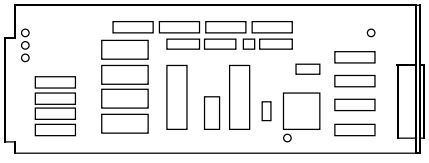
CAT5 Expansion Transmit Card (our product code KV1603C)



CAT5 Expansion Receive Card (our product code KV1604C)

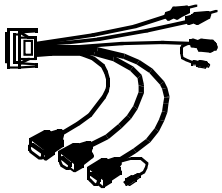


Management Card (our product code KV1608C)

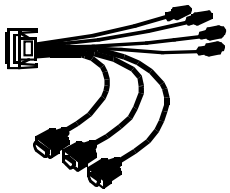


Serial Control Card (our product code KV1609C)

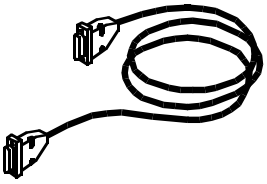
Computer-Interface (Server) Cable (our product codes KV2020 through KV2440)



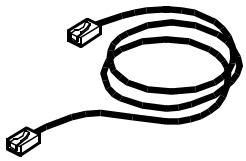
User-Interface Cable (our product codes KV2505 through KV2880)



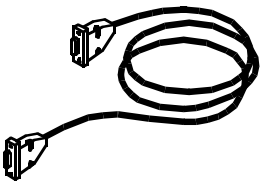
Regular Expansion Cable (our product code KV160xxx)



Solid-conductor Category 5 expansion cable (our product code EYN737MS) and stranded-conductor Cat. 5 serial-control cable (our product code EVMSL05)



AT null-modem cable (our product code EYN257H)



The complete package:

- The ServSwitch Multi Base Unit, Expansion Chassis, or MX
- A power cord
- A users' manual

Other things you will need:

- CPU-Interface Cards for each CPU you want to connect to the ServSwitch Multi.
- User-Interface Cards for each keyboard/monitor/mouse station you want to connect to the ServSwitch Multi.
- A keyboard and mouse. (Do not use an Apple keyboard and mouse if you are mixing platforms; the one-button Apple mouse is not able to trigger functions controlled by the right and center mouse buttons).
- A monitor. If you're mixing platforms, we recommend a true multiscan, multisync monitor, capable of syncing to each CPU's video-output frequencies and compatible with all of the CPUs' video cards. Also, if one of the multiple platforms is IBM, the monitor must be able to accept both separate H/V sync and composite sync. Such monitors are available from NEC, Sony®, and CTX®.

  We recommend that the monitor be able to display a maximum resolution of not less than 1280 x 1024 at a maximum refresh rate of not less than 75 Hz.

Other things you might need:

- Video adapters (see page 8).
- Headphones, speakers, and microphones for audio I/O.
- Serial cable to connect a shared serial device to the ServSwitch Multi.
- Expansion Cables and Transmit and Receive Cards for applications that exceed the capacity of a single ServSwitch Multi.
- User-Interface Cards with On-Screen Display for display-menu convenience.
- A Management Card, one or more Serial Control Cards, and the associated cables for terminal-based device control.

Chassis/Card Specifications (see page 6 for Cable Specifications)

Standards —
VGA, SVGA, XGA, XGA-2, Macintosh, or Sun video;
With optional adapters: RS/6000, SGI, or HP video

Interfaces —
Base Unit (KV150A-R2) and MX (KV155A) only:
On front panel:
Serial port and serial mouse port: EIA/TIA RS-232 pinned to EIA/TIA-574;
VGA port: VGA;
PS/2 keyboard and PS/2 mouse ports: IBM PS/2 peripheral input;
Mac port: ADB™;
Sun port: Sun peripheral input;
Mic port: Standard mono audio input;
Speakers port: Standard stereo audio output;
On CPU-, user-interface, and expansion cards:
Proprietary composites of:
- IBM PC/AT, IBM PS/2, ADB, or Sun keyboard;
- PS/2, ADB, or Sun mouse;
- RS-232 serial mouse;
- Video (standards listed above);
- Mono audio; and
- Stereo audio

Resolution —
At up to 75 Hz:
Up to 1280 x 1024 noninterlaced;
At up to 60 Hz:
Up to 1600 x 1200 noninterlaced;
Maximum video bandwidth is 155 MHz

Protocol —
RS-232: Asynchronous

Data Format —
RS-232: Transparent to data format

Data Rate —
RS-232: Up to 9600 bps with hardware flow control or up to 115.2 Kbps with software flow control

Flow Control —
RS-232: Hardware or software (autosensed)

Audio Response —
Microphone input and stereo output: From 20 Hz to 20 kHz at ±3 dB

Maximum Distance —
7.6 m(20 ft.) to any attached keyboard, monitor, and mouse;
9.1 m(30 ft.) to any attached CPU;

Maximum Distance (cont'd) —
152m of total cabling between the highest-level cascaded SSM (the one to which the monitor/keyboard/mouse stations are attached) and the lowest-level SSM (the one to which the CPUs are attached)

User Controls —
Keyboard commands;
Rear-mounted ON/OFF rocker switch;
On Base Unit (KV150A-R2) and MX (KV155A) only:
Port-selection pushbuttons (1 for each lettered port): (12) for Base Unit, (4) for MX;
On CPU-interface cards:
(6) Jumpers for video type;
(1) 8-position DIP switch for various options;
With KV2550C installed:
On-screen (video-overlay) menus;
With KV1608C installed:
Terminal-based menus (to control equipment attached to installed KV1609Cs)

Indicators —
On Base Unit (KV150A-R2):
All front-mounted:
(12) Selected-port LEDs (1 for each lettered port);
(1) 2-character display panel (5 x 9 pixel display area for each character);
On MX (KV155A):
All front-mounted:
(1) Power; (1) Fail;
(4) Selected-port LEDs (1 for each lettered port);
On EXP (KV160A-R2):
All front-mounted LEDs:
(1) Power; (1) Fail;
(14) Selected port (1 for each port);
(14) On-line (1 for each port)

Chassis Connectors —
On Base Unit (KV150A-R2) and MX (KV155A):
Front-mounted:
(2) DB9 (DE9) male:
(1) for serial mouse,
(1) for other serial devices;
(1) HD15 (DE15) female for video;
(2) 6-pin mini-DIN female:
(1) for PS/2 mouse,
(1) for PS/2 keyboard;
(1) 4-pin mini-DIN female for ADB keyboard and mouse;
(1) 8-pin mini-DIN female for Sun keyboard and mouse;
(2) RCA female:
(1) for microphone,
(1) for spkrs/headphone;
Internal card-edge female for interface-card attachment:
(14) for Base Unit, (5) for MX;

Chassis Connectors (cont'd)—
On EXP (KV160A-R2):
(14) Internal card-edge female for plug-in card attachment

Card Connectors —
On all plug-in cards:
(1) Card-edge male;
On CPU-Interface Cards:
(1) HD44 (DB44) female;
On User-Interface Cards:
(1) HD62 (DC62) female;
On regular Expansion Cards:
(2) HD26 (DA26): Both male on transmitter cards, both female on receiver cards;
On CAT5 Expansion Cards:
(6) RJ-45 female;
On Management Cards:
(1) DB9 (DE9) male;
On Serial Control Cards:
(4) RJ-45 female

Power —
Input: 90 to 240 VAC at 47 to 63 Hz from utility-power outlet, through detachable power cord and IEC 320 male inlet, to internal transformer;
Consumption: 27 watts nominal

Thermal Dissipation —
92 BTU per hour (nominal)

MTBF — 135,000 powered-on hours (POH)

Max. Operating Altitude —
3657.6 m (12,000 ft.)

Temperature Tolerance —
Operating: 5 to 40° C
Storage: –20 to 50° C

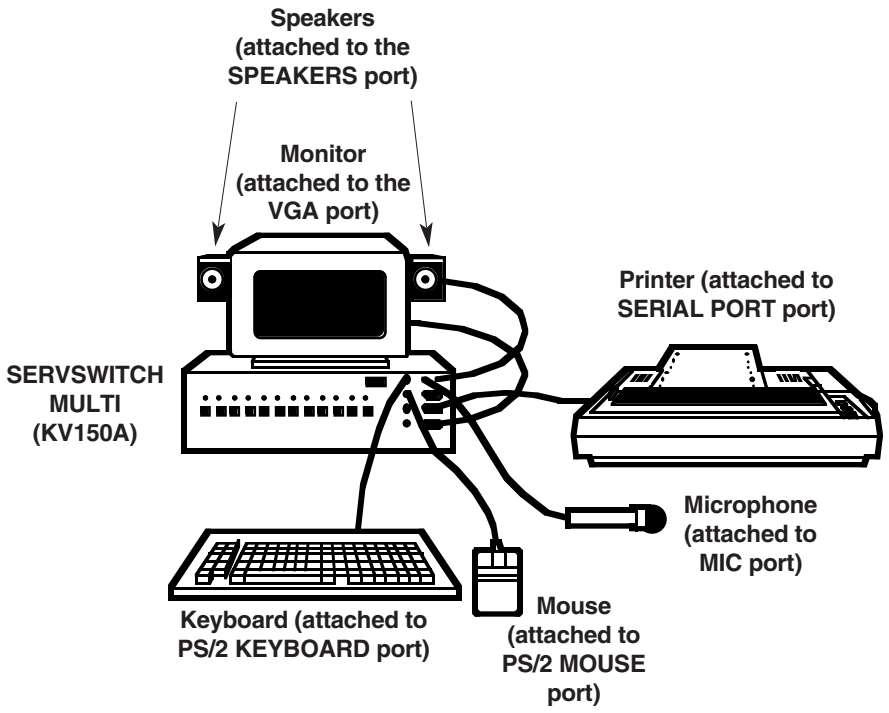
Humidity Tolerance —
Up to 90% noncondensing

Enclosure — Steel

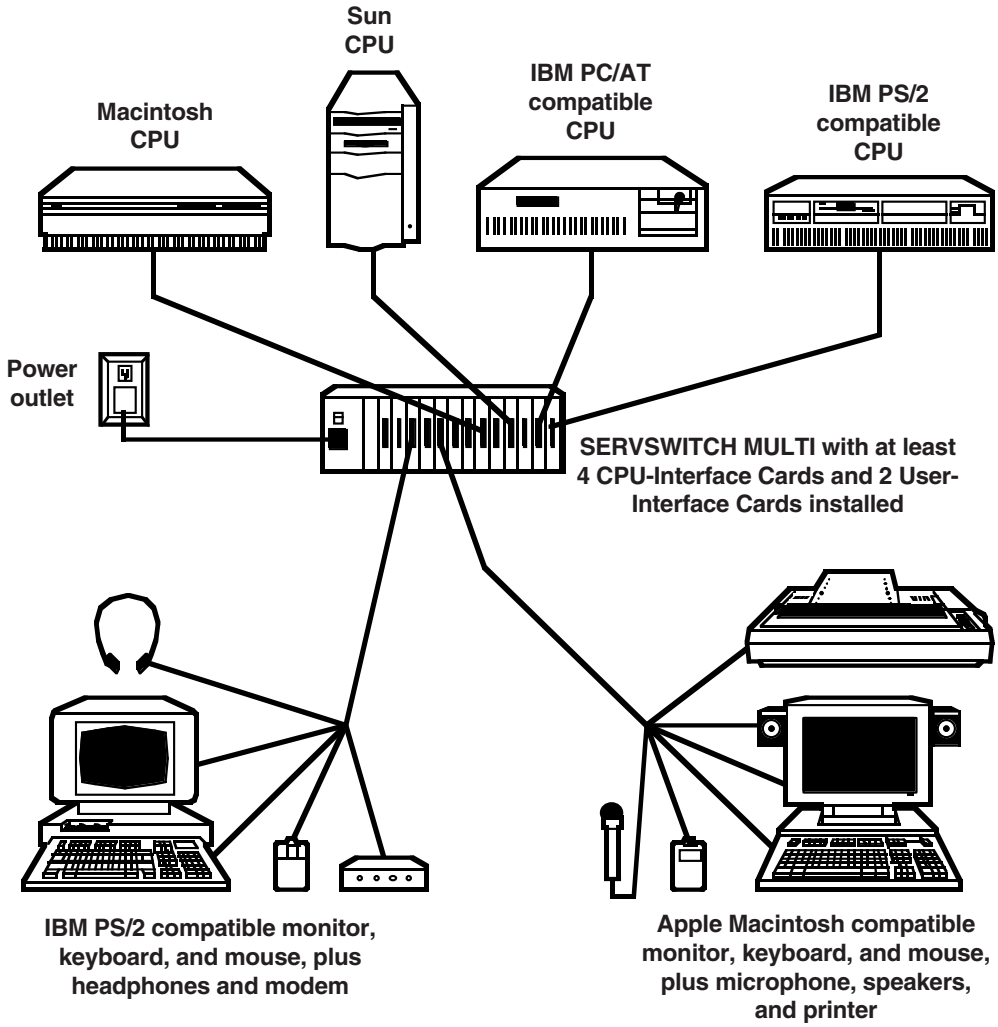
Size —
Base Unit (KV150A-R2) and EXP (KV160A-R2):
14 Hx 43.4W x 34.5D cm
(5.5"H x 17.1"W x 13.6"D);
MX (KV155A):
14H x 20.8W x 34.5D cm
(5.5"H x 8.2"W x 13.6"D)

Weight —
"Empty" ServSwitch Multi Base Unit or EXP enclosure (with power supply and local-console interface only): 8.4 kg
"Empty" ServSwitch Multi MX: 6.5 kg
Each extra Interface Card, Management Card, or Serial-Control Card adds 0.3 kg
Each extra Expansion Card adds 0.5 kg

A ServSwitch Multi with the local console equipment (that is, the local keyboard/ monitor/mouse station) attached. IBM PS/2 compatible equipment is shown.



A ServSwitch Multi with CPUs and keyboard/monitor/ mouse stations attached. Note that, although PS/2 and Mac compatible stations are shown, Sun stations should be used whenever possible when Sun CPUs are attached, so that all Sun CPU functions can be accessed from the shared mice and keyboards.



Cable Specifications

Connectors —
On User (User-Interface) Cables:
On the Switch end of all cables:
(1) HD62 (DC62) male for card connection;
On the console end of all cables:
(1) HD15 (DE15) female to monitor;
(1) DB9 (DE9) male (with yellow band on audio cables) to serial mouse;
On the console end of all audio cables (all except KV2x00):
(1) Standard mono audio jack (with blue band) to microphone;
(1) Standard stereo audio jack to speakers or headphones;
On the console end of all IBM cables (KV25x5):
(2) 6-pin mini-DIN female:
(1) to PS/2 style keyboard (cable comes with 6-pin mini-DIN male to 5-pin DIN female adapter for PC/AT type keyboards);
(1, with yellow band) to PS/2 style mouse;

Connectors —
On User Cables (continued):
On the console end of all Mac cables (KV27x0):
(1) 4-pin mini-DIN female to ADB keyboard/mouse;
On the console end of all Sun cables (KV28x0):
(1) 8-pin mini-DIN female to Sun keyboard/mouse

On Server (CPU-Interface) Cables:
On the Switch end of all cables:
(1) HD44 (DB44) male for Card connection;
On the computer end of all audio cables (all except KV2x20 and KV2020-R2):
(1) Standard mono audio plug (with blue band) to microphone input;
(1) Standard stereo audio plug to stereo output;
On the computer end of all IBM and HP audio cables (KV2040-R2, KV2060-R2, KV2080-R2, KV2440):
(1) DB9 (DE9) female to non-mouse serial port;

Connectors —
On Server Cables (continued):
On the computer end of all IBM cables (KV20x0-R2):
(1) HD15 (DE15) male to video port;
(1) 5-pin mini-DIN male to PC/AT style keyboard port;
(2) 6-pin mini-DIN male:
(1, with yellow band) to PS/2 style mouse port;
(1) for keyboard port;
(1) DB9 (DE9) female (with yellow band on audio cables) to serial mouse port;
On the computer end of all Mac cables (KV22x0):
(1) DB15 (DA15) male to video port;
(1) 4-pin mini-DIN male to ADB port;
On the computer end of all Sun cables (KV23x0):
(1) D13W3 ("13W3") male to video port;
(1) 8-pin mini-DIN male to keyboard/mouse port;

Connectors —
On Server Cables (continued):
On the computer end of both HP cables (KV2420, KV2440):
(3) BNC male for video port;
(2) 6-pin mini-DIN male:
(1, with yellow band) for mouse port,
(1) for keyboard port;

On regular expansion cable (KV1600, KV160xxx):
(2) HD26 (DA26) male;

On solid Category 5 expansion cable (EYN737MS) and stranded Category 5 serial-control cable (EVMSL05):
(2) RJ-45 male;

On AT null-modem (management) cable (EYN257H):
(2) DB9 (DE9) female;

Length — As listed below in **Ordering Information**

Ordering Information

PRODUCT NAMES	PRODUCT CODES
ServSwitch Multi Base Units (each includes one local-console user interface)	KV150A-R2
ServSwitch Multi MX	KV155A
ServSwitch Multi Expansion Chassis	KV160A-R2
Plug-In Cards:	
Universal User Interface Cards (UUICs)	KV2500C
User-Interface Cards with On-Screen Display (UICDs)	KV2550C-R2
Autosensing CPU Interface Cards (ACICs)	KV2000C
Expansion Transmit Cards	KV1601C
Expansion Receive Cards	KV1602C
CAT5 Expansion Transmit Cards	KV1603C
CAT5 Expansion Receive Cards	KV1604C
Management Cards	KV1608C
Serial Control Cards	KV1609C

Ordering Information (continued)

PRODUCT NAMES	PRODUCT CODES
User (User-Interface) Cables:	
For IBM PS/2 or PC/AT:	
30.5-cmstandard	KV2505
30.5-cm with audio	KV2515
3-m with audio	KV2545
6.1-m with audio	KV2585
For Mac:	
30.5-cm standard	KV2700
30.5-cm with audio	KV2710
3-m with audio	KV2740
For Sun:	
30.5-cm standard	KV2800
30.5-cm with audio	KV2810
3-m with audio	KV2840
6.1-m with audio	KV2880
Server (CPU-Interface) Cables:	
For IBM PS/2 or PC/AT:	
2.4-m standard	KV2020-R2
2.4-m with audio	KV2040-R2
6.1-m with audio	KV2060-R2
9.1-m with audio	KV2080-R2
For Mac:	
2.4-m standard	KV2220
2.4-m with audio	KV2240
6.1-m with audio	KV2260
9.1-m with audio	KV2280
For Sun:	
2.4-m standard	KV2320
2.4-m with audio	KV2340
6.1-m with audio	KV2360
9.1-m with audio	KV2380
For HP:	
2.4-m standard	KV2420
2.4-m with audio	KV2440

Ordering Information (continued)

PRODUCT NAMES	PRODUCT CODES
Console (User-Interface) Adapters for Non-Multisync Monitors:	
For Mac monitors (HD15 male to DB15 female, use with Mac User Cable KV27x0)	KV16MAC
For Sun monitors (HD15 male to 13W3 female, use with Sun User Cable KV28x0)	KV16SUN
For RS/6000 monitors:	
13W3 type (HD15 male to 13W3 female, use with PS/2 User Cable 25x0)	KV16RS6-1
3C3 type (HD15 male to 3C3 female, use with PSS/2 User Cable 25x0)	KV163C3-1
For SGI monitors (HD15 male to 13W3 female, use with PS/2 User Cable 25x0)	KV16SGI-1
For HP monitors (HD15 male to triple BNC female, use with PS/2 User Cable 25x0)	KV16BNC
CPU (CPU-Interface) Video Adapters:	
For RS/6000 CPUs:	
13W3 type (13W3 male to HD15 female, use with IBM Server Cable KV20x0-R2)	KV16RS6-2
3C3 type (3C3 male to HD15 female, use with IBM Server Cable KV20x0-R2)	KV163C3-2
For SGI CPUs (13W3 male to HD15 female, use with IBM Server Cable KV20x0-R2)	KV16SGI-2
Troubleshooting Adapter:	
Loopback Mouse Adapter (DB9 female; you can attach this to the serial-mouse strand of a Server Cable if you are having trouble switching to a particular PS/2 type computer)	KV16LOOP
Expansion Cables:	
Regular Expansion Cables:	
3-m	KV1600
7.6-m	KV160025
15.2-m	KV160050
30.4-m	KV160100
Solid Category 5 Expansion Cables:	
Available in a variety of *xxx*-foot stock lengths from 0.6 m to 30.4 m	EYN737MS-0*xxx*
Or in custom lengths	EYN737MS
Also available in plenum-rated versions and in bulk (unterminated) in various lengths and colors.	
Management Cables:	
AT Null-Modem (Management-Card) Cable:	
Available in a variety of *xx*-foot stock lengths from 1.8 m to 15.2 m	EYN257H-00*xx*-FF
Or in custom lengths	EYN257H
Stranded Category 5 (Serial-Control-Card) Cable, Beige:	
Available in a variety of *xxx*-foot stock lengths from 0.3 m to 30.4 m	EVMSL05-0*xxx*
Or in custom lengths	EVMSL05
Also available in other colors, and in plenum-rated versions and in bulk (unterminated) in various lengths and colors.	
Rackmount Kits:	
For Base Units	RMK19L
For EXPs	RMK19LE
(The MX model is designed as a desktop unit only and cannot be rackmounted.)	